

Public health surveillance at a mass gathering: *urs* of Baba Farid, Pakpattan district, Punjab, Pakistan, December 2010

S. Hassan,¹ R. Imtiaz,¹ N. Ikram,¹ M.A. Baig,¹ R. Safdar,¹ M. Salman¹ and R.J. Asghar¹

ترصد الصحة العمومية في أحد الحشود: الذكرى السنوية لوفاة بابا فريد، مقاطعة باكبتن، البنجاب، باكستان، كانون الأول/ديسمبر 2010

شعيب حسن، رنا امتياز، نديم إكرام، ميرزا أمير بيچ، رنا صفدار، م. سلمان، رانا جواد اصغر

الخلاصة: تهدف هذه الدراسة إلى التعرف على المشكلات الصحية التي تحدث أثناء الحشد السنوي لإحياء الذكرى السنوية لوفاة بابا فريد جانج شَكَر بمدينة باكبتن، باكستان، ورفع توصيات تُنفذ في أنشطة التخطيط والوقاية. وقد وضع الباحثون نظاماً للترصد لتسجيل البيانات المرتبطة بالصحة والخاصة بهذه المناسبة. كما أُعدت قائمة بالأمراض الواجب الإبلاغ عنها. وقام عاملون صحيون مُدرَّبون بجمع البيانات قبل انطلاق فعاليات هذه المناسبة وخلال فعالياتها وبعد انتهائها. وقد تردد إجمالي 5918 فرداً على 15 مرفقاً من مرافق الرعاية الصحية التي تُقدّم خدماتها خلال هذه المناسبة؛ وكان 58% من الاستشارات بسبب الأمراض السارية؛ 21% منها بسبب عدوى الجهاز التنفسي، و26% بسبب أمراض الجهاز الهضمي. ومثلت الإصابات 31% من الحالات، بينما مثلت الأمراض غير السارية 11%. وتُظهر التغيّرات في معدل انتشار الأمراض التي يمكن الإبلاغ عنها في المراحل الثلاث لهذه المناسبة زيادة كبيرة في الأمراض السارية. ولم يُلاحظ حدوث فاشية كبيرة لأي من الأمراض.

ABSTRACT The objective of this study was to identify health related problems encountered during an annual mass gathering in Pakpattan, Pakistan, the anniversary of the death (*urs*) of Baba Farid, and to make recommendations for planning and prevention activities. A surveillance system was established to capture health related data for the event. A list of reportable diseases was developed. Data were collected pre-, during, and post-event by health care workers trained for the purpose. A total of 5918 people reported to the 15 health care facilities providing services during the event; 58% of consultations were because of communicable diseases, 21% of which were respiratory tract infections and 26% gastrointestinal illness. Injuries accounted for 31% of cases and noncommunicable diseases for 11%. Prevalence of reportable disease during the event showed sizeable increases. No major disease outbreak was observed.

Surveillance de santé publique lors d'un rassemblement de masse : l'anniversaire de la mort de Baba Farid, dans le district de Pakpattan, au Pendjab (Pakistan), décembre 2010

RÉSUMÉ L'objectif de la présente étude était d'identifier les problèmes de santé rencontrés lors d'un rassemblement de masse annuel à Pakpattan (Pakistan), en l'occurrence l'anniversaire de la mort (*urs*) de Baba Farid Ganj Shakar, et de formuler des recommandations pour les activités de planification et de prévention. Un système de surveillance a été mis en place afin de relever les données sanitaires pour l'événement. La liste des maladies à déclaration obligatoire a été établie. Les données ont été recueillies en trois phases (avant, pendant et après l'événement) par des agents de santé formés dans ce but. Au total, 5918 personnes se sont rendues dans l'un des quinze établissements de santé qui fournissaient des services pendant l'événement. Les maladies transmissibles étaient à l'origine de 58 % des consultations, dont 21 % pour des infections des voies respiratoires et 26 % pour des maladies gastro-intestinales. Les traumatismes et les maladies non transmissibles représentaient respectivement 31 % et 11 % des cas. L'évolution de la prévalence des maladies à déclaration obligatoire pendant l'événement a enregistré une hausse significative. Toutefois, aucune flambée épidémique majeure n'a été constatée.

¹Field Epidemiology and Laboratory Training Programme, Ministry of Health, Islamabad, Pakistan (Correspondence to S. Hassan: dr_shoaib@hotmail.co.uk).

Introduction

Event history

Pakpattan is located 180 km from Punjab's provincial headquarters, Lahore. According to district health department data, the population is 150 000. The anniversary of the death (*urs*) of Baba Farid (Hazrat Fariduddin Mas'ud Ganjshakar) is observed in this city during the first 10 days of the Islamic calendar month *Muharram*. *Bahishti Dawaza* (the Gate of Paradise) at the shrine of the saint is the centre of the event. This gate is open from sunset to sunrise during 5–9 *Muharram*. Thousands of devotees form long queues that may extend up to 5 km. The 768th *urs* was celebrated from 12 to 16 December 2010. The actual celebrations started on 8 December 2010 (1 *Muharram*). Devotees from across the world started arriving in the city as early as 3 December. The *Bahishti Dawaza* was opened at sunset 12 December and closed each morning before sunrise. This practice continued till 16 December 2010.

Previous experiences

The event is celebrated every year but there is no record of disease frequencies or injuries for previous years. There have been reports, however, from local health clinicians of increased numbers for a range of diseases, particularly gastrointestinal conditions, respiratory illnesses, and injuries. In previous years there has been no established surveillance system for such events in Pakistan, so most health events went unrecognized and uninvestigated. In 2001, 27 people lost their lives in a stampede and another 125 were injured [1]; afterwards extensive security arrangements were made to prevent any such occurrence in the future. Temporary gates and walls are installed before the *urs* to control all roads leading to the shrine. This is done to manage human as well as

automobile traffic. Narrow passages are constructed using metallic bars leading to *Bahishti Dawaza* so people can safely walk through the door. These gates and walls are removed after the event.

On 25 October 2010 (around 6 weeks before this event), about 6 people died and more than a dozen were injured in a bomb blast at the shrine [2]. Due to the intensity of religious sentiments attached to events such as these, there is always a threat of terrorism, and this can pose serious issues in regard to public health response.

Public health importance

Mass gatherings over extended periods of time pose unique challenges to the existent systems [2]. The *urs* of Baba Farid attracts people from all walks of life; the local health administration estimates about 500 000 people attended the event in 2010. Large gatherings such as this one held in small towns or cities strains the local administration, which has to allocate additional resources to manage the event [3]. A large number of security personnel from adjacent districts are deputed to ensure the security and safety of attendees.

The numbers and diversity of the population attending the event poses many challenges. Such large numbers gathered in close quarters for variable periods of time pose a risk of spreading communicable diseases, particularly respiratory and gastrointestinal ailments. There is a high risk of outbreaks in such gatherings. Overcrowding of the streets with people and vehicles leads to road traffic accidents. Many hotels in the city are booked to capacity forcing people to stay on the pavements on open streets. People with various diseases visit the shrine in the belief that they will be cured. People are obliged to eat on the roadside, buying food from mobile vendors. Such practices make them susceptible to gastrointestinal problems.

Aim

The aim of this study was to determine the prevalence of communicable and noncommunicable diseases and injuries important to public health at this annual event. This information could be used to prevent both diseases and injuries and therefore may lead to healthier and safer mass gatherings in future. Specifically, we aimed to:

- identify stakeholders and include them in surveillance implementation and response;
- prioritize diseases under surveillance and collect data from selected sites;
- analyse the collated data and disseminate information for timely action;
- make recommendations for future events.

Methods

After gaining approval from the local administration to carry out surveillance at this mass gathering event, a list of stakeholders was prepared. The local administration and the health and rescue departments were involved in implementing this surveillance system. Representatives of the security agencies were also an integral part of the system. Stakeholders agreed to a high priority risk assessment exercise and daily evening coordination and debriefing meetings. The local health department ran a campaign on disease prevention and hygiene.

A pre-event risk assessment exercise was undertaken a few weeks prior to the *urs*; this included reviewing any data available at local health department and local administration office from previous experience. The most important considerations were diseases prevalent in the area, especially those with an outbreak potential, and environmental factors, which included both weather conditions and the nature/characteristics of the crowd, e.g. enormous crowds performing rituals

and activities both indoors and outdoors, extended exposure, and mobility in large open spaces and in small closed areas. Security and terrorism threats during the event were also considered.

The initial assessment exercise resulted in a breakdown of priority diseases into 3 main groups of reportable diseases/conditions: communicable diseases, noncommunicable diseases, and physical trauma and injuries. Reportable conditions were:

- respiratory tract-related illness
 - chronic obstructive pulmonary disease
 - asthma
- gastrointestinal tract-related illness
 - diarrhoea
 - dyspepsia/gastro-oesophageal reflux disease
- febrile illness
 - malaria
 - fevers other than malaria

- chronic disease
 - ischaemic heart disease
 - hypertension
 - diabetes
- injury resulting from:
 - road traffic crashes
 - falls
 - riots.

Based on the priority disease list, a hybrid syndromic and injury surveillance procedure was established. All 15 health facilities providing health care around the locations of this event were selected for collection of data: 8 public, 6 private and 1 nongovernmental (NGO)-based. Public health sector facilities were established within and near the shrine area as usual for this event and these were provided with medicines and first aid kits by the local health department. Health facility counters established the purposes of this survey were made prominent with banners and signboards. Staff at these facilities had pre-event training

on tasks like case definitions and patient data recording and sharing.

After initial medical care, patients could be referred to the main district hospital if necessary. Patients were treated even if they were not willing to participate in the survey or share their information. Almost all those treated agreed to participate and all were assured that their identity would remain confidential and would not be shared without their consent.

Everyone attending the selected health care facilities, irrespective of their permanent place of residence, was included in this study.

Case definitions

Case definitions were developed based on history and clinical examination, discussions with general physicians, and consultation of standard references [4,5]. Case definitions were pre-tested at the district health facility as a part of the pre-event phase

Table 1 Case definitions used for patients presenting at participating health facilities during the mass gathering for the *urs* of Baba Farid, Pakpattan, December 2010

Condition	Case definition
Acute respiratory illness	< 4-hour history of cyanosis or dyspnoea, plus Breathing rate (for age group): <ul style="list-style-type: none"> • 40/min (< 1 year) • 30/min (1–5 years) • 20/min (> 5 years)
Asthma	At presentation history of at least 2 recurrent episodes of: <ul style="list-style-type: none"> • cough • dyspnoea • wheeze
Chronic obstructive pulmonary disease	At presentation history of at least 2 recurrent episodes of: <ul style="list-style-type: none"> • cough • sputum • history of smoking
Dyspepsia	At presentation having at least 2 recurrent episodes of: <ul style="list-style-type: none"> • anorexia • vomiting • tender epigastrium
Diarrhoea	Presenting with complaint of > 2 loose stools in 1 day
Hypertension	Having a single record of blood pressure > 140/90 at the time of presentation
Ischaemic heart disease	History of ischaemic heart disease or complaining of chest pain on exertion at presentation
Diabetes mellitus	Presenting with history of diabetes or blood sugar levels recorded as: <ul style="list-style-type: none"> • fasting blood sugar > 7 mmol/L • or random blood sugar > 11.1 mmol/L
Malaria	History of episodes of fever with chills and malaria positive confirmed by rapid diagnostic tests at health facility counter
Other febrile cases	Fever recorded as > 100 °F due to any illness except malaria

and edited based on the diversity of symptoms encountered (Table 1). For injury surveillance at this venue, road traffic accidents, falls, riots or stampedes during the event were recorded.

Data collection and analysis

On-site, temporary health facility counters were established to provide health care and surveillance. Staff at these facilities were trained to carry out the survey. A central data collection unit was established in the control room at the executive district health office and all the public health surveillance activities were coordinated there. In consideration of the outbreak potential, increased numbers (more than the usual levels) of high impact events like food- or waterborne illnesses and mass injuries had to be reported by telephone as early as possible.

Daily data collation and the database were managed using *Microsoft Excel*.

Results

A total of 5918 consultations were recorded at the 15 selected health facilities. Most of the patients (76.2%) reported at the 8 public sector facilities, 18.5% reported at the 6 private facilities, while 5.3% reported at the 1 NGO facility. Case definitions were agreed for 4896 of the patients. About 80% of the complaints were about reportable, high priority diseases. The

majority (67%) of the reporting patients were male.

Among the reportable diseases, observed frequency 58% of consultations were for communicable diseases during the event period. This was up from 51% during the week prior to the event (Table 2). Among the communicable diseases, respiratory tract infections accounted for 21% and gastrointestinal infections for 26% during the event phase.

Although the majority of the patients reported at the public sector health facilities, the data from the private and NGO sectors were also important (approximately 24% of the total recorded encounters). There were participants of all ages, but the majority (62.3%) were aged 15–49 years. The second largest group was those aged 50+ years (23.3%).

Prevalence of acute respiratory illness showed the most dramatic increase, rising from 6.7 per 100 000 in the week before the event to 167.0 per 100 000 during the event (Table 3). Prevalence of diarrhoea and dyspepsia increased considerably, from 6.0 and 4.0 per 100 000 to 82.0 and 114.0 per 100 000 respectively. Among the chronic diseases, the greatest increase in prevalence was for hypertension, from 12.0 per 100 000 in the week prior to the event to 66.0 per 100 000 during the event. Malaria prevalence showed no appreciable change, however, during the event period, prevalence of fever other than malaria was reported as 72 per 100 000 (Table 3).

Discussion

Communicable diseases accounted for the greatest number of visits to healthcare facilities in all 3 phases of the event. There were some small clusters reporting identical health related complaints; district health departments and other response units were informed on a real-time basis, but no outbreaks or common sources were found. There were mobile vendors selling food in the city without any inspection of hygiene practices or food quality. Failure of various efforts to capture any common source for the gastrointestinal-related conditions may be because these vendors changed location frequently as well as the huge influx of people and overcrowding during the event.

Before the event started, the city experienced a great influx of vehicles. This not only put a strain on the traffic system but also contributed to air pollution. The number of road traffic accidents and respiratory tract-related illnesses are also a result of the heavy traffic influx.

This study had certain limitations. As health facilities were scattered around the event centre over different parts of the city, this may have resulted in some cases reporting to more than 1 facility to seek support at various times during the course of the same illness. Owing to resource limitations, we had a limited workforce available for case

Table 2 Distribution of medical conditions according to type recorded during the three phases of the mass gathering for the urs of Baba Farid, Pakpattan, December 2010

Type of disease/condition	Pre-event (n = 74)		During event (n = 4719)		Post-event (n = 103)		Total (n = 4896) ^a	
	No.	%	No.	%	No.	%	No.	%
Communicable	38	51	2742	58	49	48	2829	58
Noncommunicable	23	31	504	11	33	32	560	11
Injury	13	18	1473	31	21	20	1507	31

Pre-event (phase 1) = the week before the event.

During event (phase 2) = over the 10 days of the event.

Post event (phase 3) = the week after the event.

^aOf the 5918 patients recorded and treated in total, case definitions were agreed for 4896.

Table 3 Prevalence (per 100 000) of selected conditions treated at 15 healthcare facilities providing services for the mass gathering for the *urs* of Baba Farid, Pakpattan, December 2010

Condition	Pre-event	During event	Post-event
Acute respiratory illness	6.7	167.0	7.3
Asthma	4.7	3.5	6.0
Chronic obstructive pulmonary disease	2.0	13.5	3.0
Hypertension	12.0	66.0	14.0
Malaria	2.0	5.0	0.0
Other fever	0.0	72.0	0.0
Diarrhoea	6.0	82.0	8.7
Dyspepsia	4.0	114.0	7.0

Pre-event (phase 1) = the week before the event.

During event (phase 2) = over the 10 days of the event.

Post event (phase 3) = the week after the event.

follow-up, active case finding and contact or source tracing. It is possible there were more cases who did not report to the health facilities or who sought over-the-counter treatment. The source of the significant rise in acute respiratory infections during the event could not be verified because of the limited laboratory resources available.

An improved traffic control plan, put in place prior to the event, may serve to decrease traffic-related injuries. Local health and other related departments should collaborate to improve sanitation and food quality for this mass gathering. In future, during such events laboratory services should be considered part of the surveillance systems.

It is necessary to have surveillance mechanisms in place so that the health events are both recorded and

responded to. The participation of a trained epidemiologist may prove helpful in case investigations of reportable diseases during future events.

Although we did not directly experience a terrorist attack during our study, considering the current wave of such attacks, local administrative and health departments should be trained for disaster management in order to deal with any unforeseen event.

Lastly, surveillance should continue, not only for this event, but for other mass gatherings in Pakistan and a comparative study over the coming years needs to be implemented so that common health problems at mass gatherings are seen holistically. The data collected would lead to the implementation of adequate preventive measures that would improve community health and make such gatherings safer.

Acknowledgements

We wish to thank the following people for their support during this study:

- Provincial Secretary for Health, Government of Punjab, Lahore;
- Director General for Health, Government of Punjab, Lahore;
- District Coordination officer, Pakpattan District;
- Executive District Officer Health, Pakpattan District;
- Executive District Officer Health, Muzafar Garh District;
- Medical Superintendent, District Headquarter Hospital, Pakpattan District;
- Medical Superintendent, Tehsil Headquarters Hospital Ali Pur, Muzafar Garh District;

References

1. *Fatal stampede at Pakistan festival*. London, BBC News (website), 2001 (http://news.bbc.co.uk/2/hi/south_asia/1254207.stm, accessed 13 October 2013).
2. Khan OF. *Bomb blast at Sufi shrine in Pakistan kills 6, injures 16*. Ahmedabad, Times of India (website), 2010 (http://articles.timesofindia.indiatimes.com/2010-10-25/pakistan/28254457_1_pakpattan-shrine-abdullah-shah-ghazi, accessed 13 October 2013).
3. Polkinghorne BG et al. Prevention and surveillance of public health risks during extended mass gatherings in rural areas: the experience of the Tamworth Country Music Festival, Australia. *Public Health*, 2013, 127(1):32–8.
4. *2010 National notifiable infectious conditions*. Atlanta, Georgia, Centers for Disease Control and Prevention, 2010 (<http://wwwn.cdc.gov/NNDSS/script/ConditionList.aspx?Type=0&Yr=2010>, accessed 13 October 2013).
5. Colledge NR, Walker BR, Ralston SH (eds). *Davidson's principles and practice of medicine*, 20th ed. Edinburgh, Churchill Livingstone, 2010.